DCS & Labelling Worldwide

# CL4xxe-2A Printers Operation Manual

**Issued December 2000**

## SATO Group of Companies

***www.satoworldwide.com***


| | |
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**Warning:** This equipment complies with the requirements in Part 15 of FCC rules for a Class A computing device. Operation of this equipment in a residential area may cause unacceptable interference to radio and television reception requiring the operator to take whatever steps necessary to correct the interference.


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# Warning

It is essential that the safety and operating procedures contained within this manual be brought to the attention of, and are used by, all personnel likely to operate this printer/product.

This printer/product must only be used for the purpose for which it was designed.

This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

Electrostatic discharges on the connector pins and on the memory card may damage the printer.

In the case of fire, water must not be used on the product to extinguish the fire, and the appropriate type of fire extinguisher should be readily available.

No modifications, either mechanical or electrical, should be made to this printer/product or accessory without the written consent of SATO Europe N.V. Any modifications made without this consent may invalidate guarantee claims.

Other manuals relating to this printer include additional information relating to other aspects of the safe operation of the printer, and are available from your SATO supplier.

All consumable waste, such as the label backing paper and used carbon ribbon must be disposed of carefully, and in a manner that will cause the minimum of environmental pollution.

Should you have any doubts regarding the setting, operating or any safety aspects of this printer/product, please contact your SATO supplier.

SATO Europe N.V. makes no guarantee that all the features described in this manual are available in all models, and, due to SATO's policy of continuous development and improvement, specifications are liable to change, without notice.

## Consumables

Always use SATO carbon ribbons or equivalent. The use of incorrect materials may cause malfunctions of the printer and void the warranty.

## Conventions

Text that appears bold italic and all in capitals such as ***LABEL*** refers to a key or an LED on the operation panel.

Text that appears enclosed in brackets such as <ESC> refers to an Escape sequence of a data string.

Text that appears bold italic such as ***On-Line*** refers to a function or to a result.

Text that appears in bold such as **VR1** refers to electrical components like pins, resistors connectors and so on.

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# 1. Specifications

The major difference in the CL408e and the CL412e printers is the resolution of the head. The CL408e with its 203 dpi head provides an economical labeling solution for most applications. The CL412e provides a higher print resolution, 305 dpi, to give laser quality printing. It is useful when higher resolution is needed for detailed graphic images.

| | ***CL408e*** | ***CL412e*** |
|---|---|---|
| **Print Type** | Direct Thermal, Thermal Transfer | |
| **Resolution** | 0,125 mm (8dot/mm, 203dpi) | 0,083 mm (12dot/mm, 305dpi) |
| **Speed** | User selectable from 50 mm/sec to 150 mm/sec | User selectable from 50 mm/sec to 100 mm/sec |
| **Darkness** | 5 steps; selectable by printer driver (<ESC> code) or via display | |
| **Print Area** | Pitch Width<br>178mm 104mm Standard<br>356mm 104mm <AX><br>1249mm 104mm Option <EX> | Pitch Width<br>178mm 104mm Standard<br>356mm 104mm <AX><br>830mm 104mm Option <EX> |
| **Media Width** | 22~128 mm (25~131 mm incl. Backing paper) | |
| **Media Length and Calliper** | Batch: 06~178 (09~181 mm incl. backing paper) 0,08~0,21 mm<br>Dispense: 17~178 (18~181 mm incl. backing paper) 0,08~0,18 mm<br>Cutter: 17~178 (18~181 mm incl. backing paper) 0,08~0,21 mm<br>Tear-Off: 17~178 (18~181 mm incl. backing paper) 0,08~0,21 mm | |
| **Label Roll** | Maximum Roll Diameter: 220 mm (face in)<br>Label Inner Core Diameter: 38-76 mm | |
| **Media Types** | Die-cut label; Continuous Material; Tag Material, Roll Type - face-in, Fan-Fold Type, Fabric. | |
| **Carbon Ribbon** | 450 metre long, face in, I.D. 25,4 mm, thickness: 4.5 micron, black and coloured | |
| **Bar-Codes** | UPC A/E; EAN 8 & 13; Code 39; Code 128; UCC/EAN 128; Interleaved 2 of 5; Industrial 2 of 5; Matrix 2 of 5; NM-7; MSI; Bookland; Postnet | |
| **Bar-Code Ratios** | 1:2, 1:3, 2:5 | |
| **Bar-Code Sizes** | Height: 4 dots to 600 dots; width – user definable | |
| **Rotational Capability** | 90° steps | |
| **2-D Codes** | Data Matrix, Maxicode, PDF 417, QR-Code | |

| | | |
|---|---|---|
| **Fonts** | U; S; M; WB; WL; XU; XS; XM; XB; XL; OCR-A/B; Outline Font (50-999)<br>Rasterizer Font Triumvirate & Times (08 – 99 points or 16 – 999 dots) | |
| **Label Sensing** | Reflective Sensor (eye-mark) bottom reading, movable<br>See-through Sensor (Gap), movable | |
| **CPU** | 32 bit SH3 RISC Processor/ 117MHz | |
| **Memory Capacity** | 16MB SDRAM; 2,9MB Input Buffer; 2MB Flash Memory Intern (standard)<br>Memory Expansion Optional - Internal: 4MB Flash Memory SIM Card<br>- External: up to 4MB S-RAM Card or up to 16MB Flash Card | |
| **Interfaces** | ECP Parallel (IEEE 1284)<br>Centronics Parallel<br>RS232C Standard (2400 – 19.200 Baud)<br>RS232C Highspeed (9600 – 57.600 Baud)<br>USB (12Mbit/s)<br>LAN (TCP/IP protocol 10/100 Base T)<br>Twinax/Coax<br>RS422 / 485 | |
| **Front Panel** | Operation Switches<br>Setting Switches<br>LED<br>LCD | Online Key, Feed Key<br>2 x Dip-Switches<br>Status<br>Menu Controlled Printer Configuration and Error Messages<br>Supported Languages:<br>English (default), German, French, Spanish, Italian, Portuguese |
| **Dimensions** | Height: 324,9 mm Width: 278 mm Depth: 429,4 mm | |
| **Weight** | 13 kg (standard) | |
| **Power** | 110 - 240V +/- 10%, 50/60 Hz, 130W | |
| **Environmental Conditions** | Operating: +5 ~ +40°C, humidity 30 ~ 80% RH non-condensing<br>Storage: -5 ~ +60°C, humidity 30 ~ 90% RH non-condensing | |
| **Approvals** | UL, CSA, TÜV-GS, CE | |
| **Options** | Guillotine Cutter, Dispenser with Internal Backing Paper Rewinder,<br>External Label Rewinder R400, Memory Expansion, Smart Keyboard | |

# 2. Introduction

The SATO CL408e/412e Printer Operation Manual provides information for installing and maintaining the SATO CL408e/412e printers. Step-by-step maintenance instructions are included in this manual with typical problems and solutions. It is recommended that you become familiar with each section in this manual before installing and maintaining the printer. This manual is divided into the following six sections:

- Chapter 1 - Specification
- Chapter 2 - Introduction
- Chapter 3 - Printer Configuration
- Chapter 4 - Media Loading
- Chapter 5 - Troubleshooting
- Chapter 6 - Cleaning and Maintenance
- Appendix

## 2.1 Installation Considerations

Printer operation can be affected by the printer environment. The location of the printer should be free from dust, humidity, and sudden vibrations. To obtain optimum results from the printer, avoid locations influenced by:

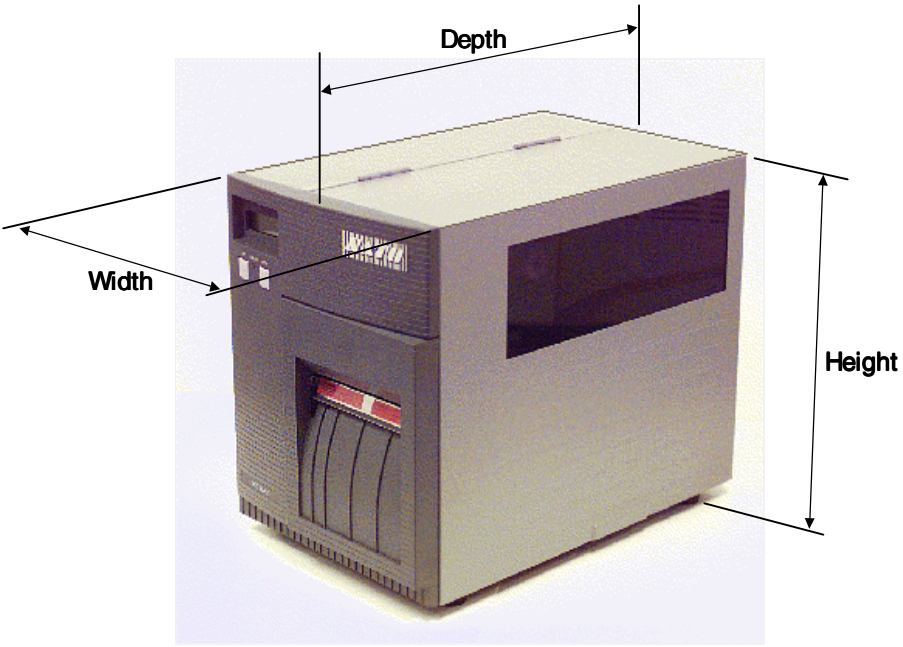
- Direct or bright sunlight since bright light will make the label sensor less responsive and may cause the label to be sensed incorrectly.
- Warm temperatures which can cause electrical problems within the printer.

## 2.2 Ribbon

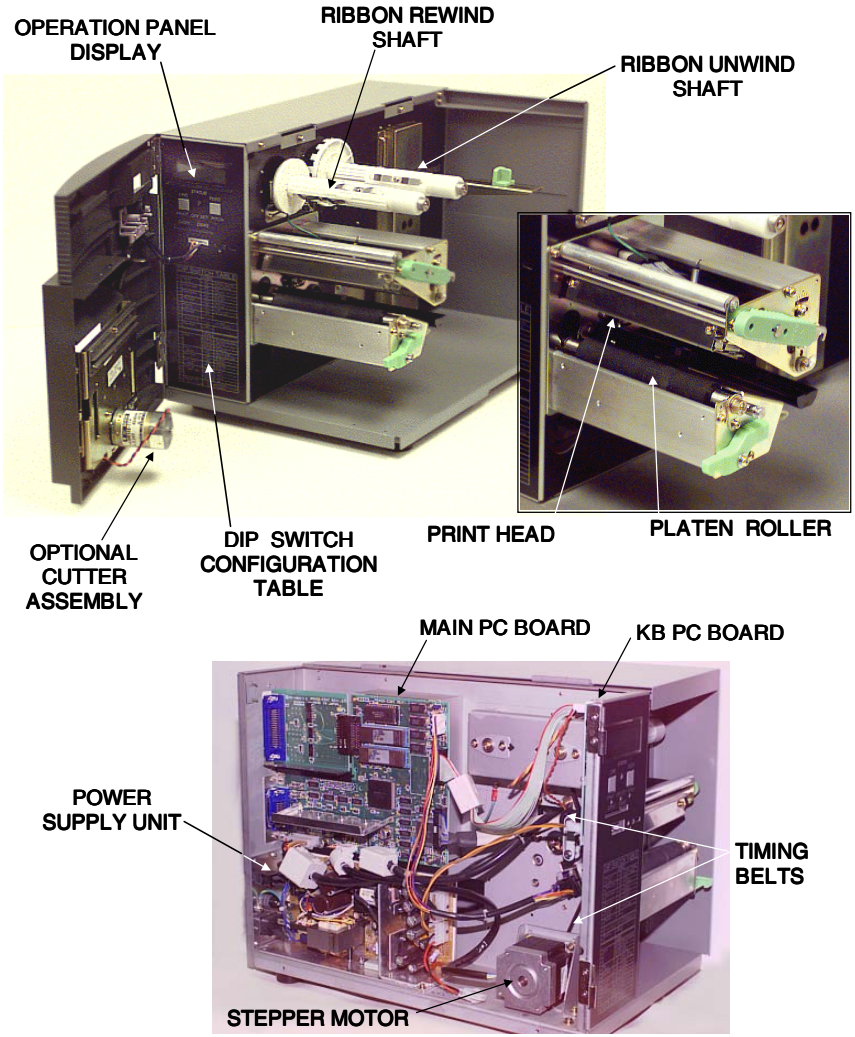
Use only SATO thermal transfer ribbons which were formulated expressly for use in all SATO printers. Use of other than approved ribbons may result in unsatisfactory print quality and/or damage to the print head and may void your warranty.

## 2.3 Dimensions

| | |
|---|---|
| Width | 278 mm |
| Depth | 429.4 mm |
| Height | 324.9 mm |



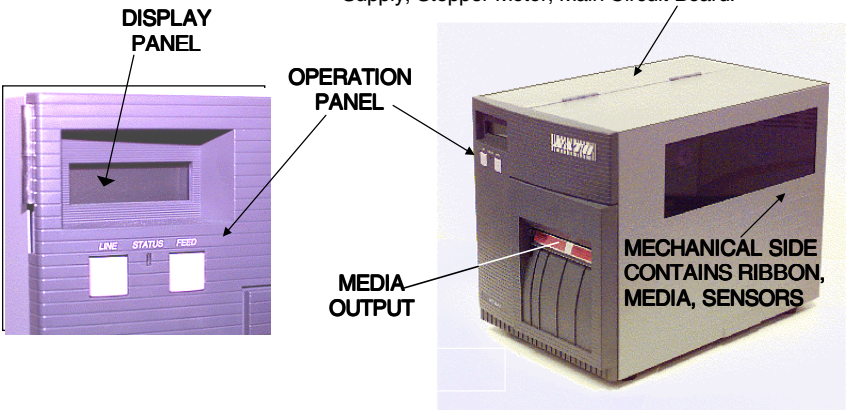
## 2.4 Component Designations



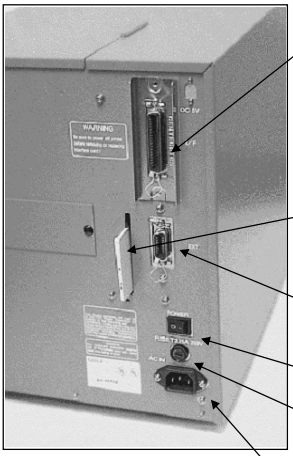
## 2.5 Interface Connections, Input And Output Panel

### FRONT OF UNIT

**ELECTRONICS SIDE:** Contains Main Logic Power Supply, Stepper Motor, Main Circuit Board.




### REAR OF UNIT

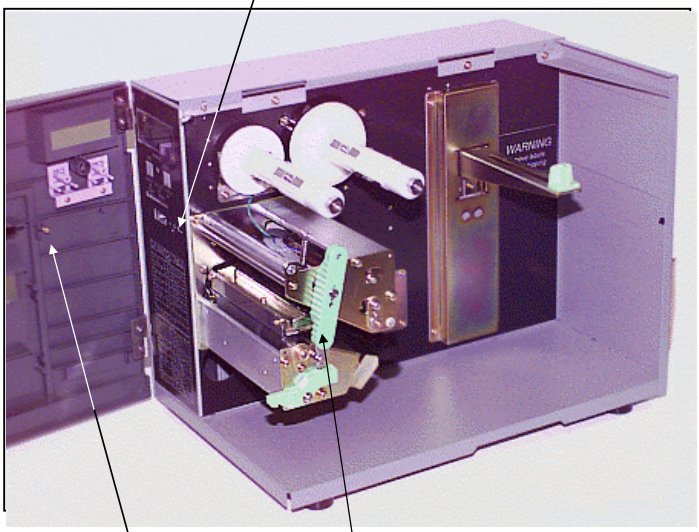


***Boards are supplied with the following connectors:***

| | |
|---|---|
| **PARALLEL CONNECTOR:** | For printer using parallel communication connection. |
| **RS232 CONNECTOR:** | For printer using serial communication connection. |
| **TWINAX/COAX, USB, LAN:** | For printer operating in a mini/mainframe/network environment. |
| **MEMORY CARD SLOT:** | Optional connectors for use with PCMCIA Memory Card. |
| **EXT. CONNECTOR:** | This is an external signal connector. |
| **POWER ON/OFF SWITCH:** | To turn power On or Off |
| **AC FUSE:** | To protect the machine from abnormal power input. Type 3A/250V |
| **AC INPUT CONNECTOR:** | To input 220V 50/60 Hz. Use power cable provided. |

## 2.6 Switches And Sensors

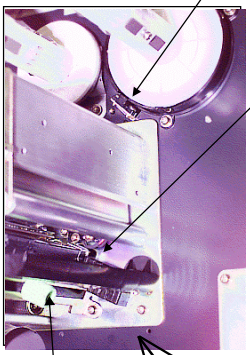
**COVER OPEN SENSOR:** When this sensor is activated, the printer will not and ***Cover Open*** message will be displayed on display panel.




**HEAD OPEN LEVER:** When the print head is opened, this switch is activated and the printer will stop printing or is not ready to print.

**INTERLOCK TAB:** The front cover is fitted with a micro switch. When the cover is opened, the cover open sensor is activated and the printer will stop printing or is not ready to print.

**RIBBON SENSOR:** This sensor is a motion detector that signals the printer when the ribbon supply is turning. This sensor is used for both the ribbon end and ribbon near end (approximately 45 feet) sensing.



**LABEL SENSOR:** Both the "I"-mark (reflective) and Gap(transmissive) sensors on the CL408/412 can be adjuste over a limited range. They are both located in the label sensor unit. The assembly can be adjusted by loosening the green sensor adjust knob located underneath the label transport assembly and sliding the label sensor unit to the desired position. The gap sensor can be adjusted from a minimum of 0.67 in (17mm) to a maximum of 2.5 in. (64 mm) and the "I"-mark from a minimum of 0.25 in. (6 mm) to a maximum of 2.1 in. (53 mm) from the fixed position, "inside label guide".

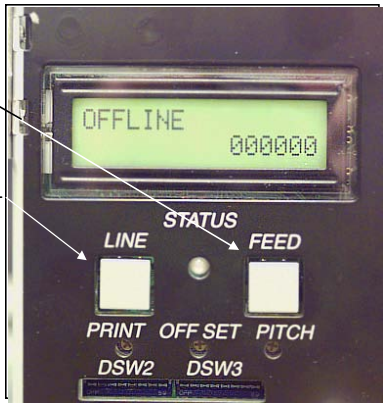
**SENSOR ADJUST KNOB**

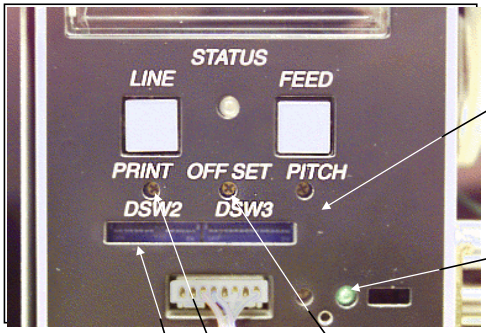
**Sensor unit**

**I-mark** **Gap**

**FEED Key:** Momentary switch. Pressing this key feeds one blank label through the printer when it is off-line. When the printer is on-line, another copy of the last label will be printed if "Reprint w\Feed is selected in The printer menu.

**LINE Key:** Momentary switch. Pressing this key toggles the printer between the on-line and off-line mode. When the printer is on-line, it is ready to receive data from the host. This key acts as a pause during a print job by taking the printer off-line. It can also be used as a pause function key to stop the printer during the printing process.




**PITCH Potentiometer:** Adjusts home position of the label(+/- 3.75mm). Affects stop position of label feed, print position, and dispense position. Larger adjustments should be made using the Pitch Offset function.

**Function Indicator:** When Cutter or Dispenser is used.

**OFFSET Potentiometer:** To adjust back/forward feed for dispenser (+/- 3.75mm).

**PRINT Potentiometer:** To adjust print darkness (fine adjustment).

**DSW2 & 3:** DIP Switches to set operational parameters of printer.

NOTE: Optional RS232 Communication Card contains DSW1 switches which are configured when supplied with the printer.

## Status LED

| | |
|---|---|
| OFF: | Offline |
| Green: | Online |
| Flashing Green: | Data receiving or input buffer near full |
| Orange: | Data compiling |
| Red: | Error condition |

## 2.7 Computer Connections

### 2.7.1 Bi-directional parallel interface

1. Turn off the power of the printer. Using an interface cable connect the computer to the bi-directional parallel interface connector at the rear panel of the printer.
2. Be sure to use a IEEE1284 compatible cable.

Connector: 36 PIN Amp

Max. Cable length: 1,8 m Centronic
5 m IEEE1284

Wire Connection Table for IEEE1284 compatible cable:

| Host | | Printer |
|---|---|---|
| 1 | Strobe | 1 |
| 2 | D0 | 2 |
| 3 | D1 | 3 |
| 4 | D2 | 4 |
| 5 | D3 | 5 |
| 6 | D4 | 6 |
| 7 | D5 | 7 |
| 8 | D6 | 8 |
| 9 | D7 | 9 |
| 10 | AKN | 10 |
| 11 | Busy | 11 |
| 12 | PE | 12 |
| 13 | Select | 13 |

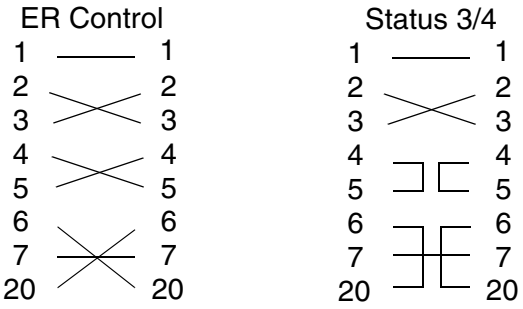
| Host | | Printer |
|---|---|---|
| 14 | LF | 14 |
| 15 | Error | 32 |
| 16 | Init | 31 |
| 17 | Select in | 36 |
| 18 | GND | 33 |
| 19 | GND | 19 |
| 20 | GND | 21 |
| 21 | GND | 23 |
| 22 | GND | 25 |
| 23 | GND | 27 |
| 24 | GND | 29 |
| 25 | GND | 30 |
| Shield | | Shield |

### 2.7.2 Optional interface (RS232C)

Connecting the printer to your computer.

1. Turn off the power of the printer. Using an interface cable connect the computer to the optional interface connector at the rear panel of the printer.
2. Interface Cable
   The wire connection varies depending on the communication product.
   Prepare an appropriate cable for the communication protocol.

Connector: DSUB-25S.
Cable length: Less than 5 meters.



### 2.7.3 Optional Interface (USB)

Connecting the printer to your computer.

1. Turn off the power of the printer. Using an interface cable connect the computer to the optional interface connector at the rear panel of the printer.
2. Interface Cable
   USB connector for a printer is specified as a Type B Receptacle. Please use a Type B cable when you connect it with the printer.

### 2.7.4 Optional Interface (LAN)

Connecting the printer to a network.

1. Turn off the power of the printer. Using an interface cable connect the computer to the optional interface connector at the rear panel of the printer.
2. Interface Cable
   Please use a cross-cable when you connect one printer to one computer. If you connect a printer to a HUB, please use a straight cable.

# 3. Printer Configuration

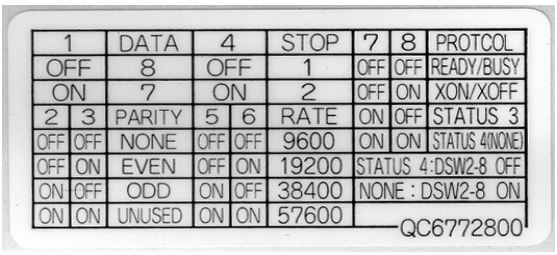
## 3.1 DIP Switch Settings

Two DIP switches DSW2 and DSW3 are located under the front door panel and a DSW1 switch is located on an optional RS232 serial interface board.

These switches can be used to set:

- RS232C transmit/receive parameters
- Thermal transfer or direct thermal mode
- Label sensor enable/disable
- Head check mode
- Hex dump mode
- Receive buffer size
- Operation mode

**DIP Switch Panel Layout for DSW1 Located on RS232 Interface Board**


1 DATA 4 STOP 7 8 PROTCOL
OFF 8 OFF 1 OFF OFF READY/BUSY
ON 7 ON 2 OFF ON XON/XOFF
2 3 PARITY 5 6 RATE ON OFF STATUS 3
OFF OFF NONE OFF OFF 9600 ON ON STATUS 4(NONE)
OFF ON EVEN OFF ON 19200 STATUS 4:DSW2-8 OFF
ON OFF ODD ON OFF 38400 NONE : DSW2-8 ON
ON ON UNUSED ON ON 57600
QC6772800

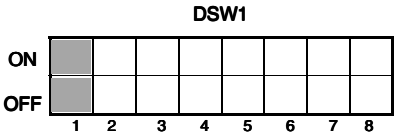
To set the switches, first power the unit Off, then position the DIP switches. After placing the switches in the desired positions, power the printer back on. The switch settings are read by the printer electronics during the power up sequence. They will not become effective until the power is cycled.

## 3.1.1 RS232 Transmit/Receive Setting

### Data Bit Selection (DSW1-1)

This switch sets the printer to receive either 7 or 8 bit data bits for each byte transmitted.

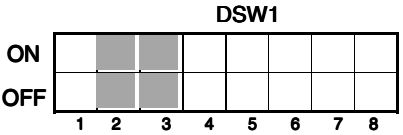
| DSW1-1 | SETTING |
|---|---|
| *OFF | 8 Data Bits |
| ON | 7 Data Bits |




### Parity Selection (DSW1-2, DSW1-3)

These switches select the type of parity used for error detection.

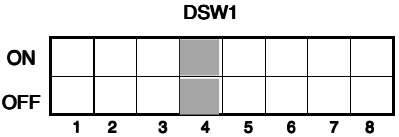
| DSW1-2 | DSW1-3 | SETTING |
|---|---|---|
| *OFF | *OFF | No Parity |
| OFF | ON | Even |
| ON | OFF | Odd |
| ON | ON | Not Used |




### Stop Bit Selection (DSW1-4)

Selects the number of stop bits to end each byte.

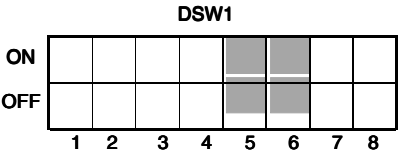
| DSW1-4 | SETTING |
|---|---|
| *OFF | 1 Stop Bit |
| ON | 2 Stop Bits |




### Baud Rate Selection (DSW1-5, DSW1-6)

Selects the data rate(bps) for the RS232 port.

| DSW1-5 | DSW1-6 | SETTING |
|---|---|---|
| *OFF | *OFF | 9600 |
| OFF | ON | 19200 |
| ON | OFF | 38400 |
| ON | ON | 57600 |

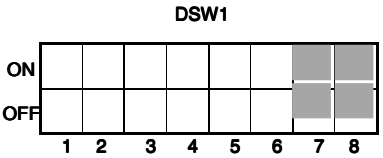



*** Factory Default**

### Communication Protocol Selection (DSW1-7, DSW1-8)

Selects the flow control and status reporting.

| DSW1-7 | DSW1-8 | SETTING |
|---|---|---|
| *OFF | *OFF | Rdy/Bsy |
| OFF | ON | Xon/XOff |
| ON | OFF | Status 3 |
| ON | ON | Status 4 |

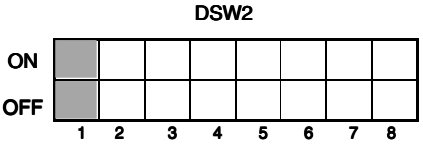



***Note:*** ***For Status 4 the DSW2-8 must be set to OFF***

### Print Mode Selection (DSW2-1)

Selects between direct thermal printing on thermally sensitive paper and thermal transfer printing using a ribbon.

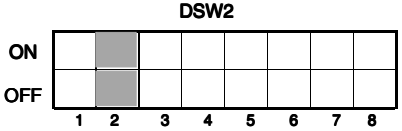
| DSW2-1 | SETTING |
|---|---|
| *OFF | Therm Trans |
| ON | Direct Therm |




### Sensor Type Selection (DSW2-2)

Selects type of sensing.

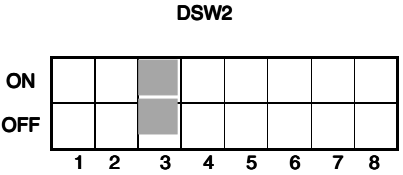
| DSW2-2 | SETTING |
|---|---|
| *OFF | Gap |
| ON | “I” Mark |




### Head Check Selection (DSW2-3)

When selected, the printer will check for head elements that are electrically malfunctioned.

| DSW2-3 | SETTING |
|---|---|
| *OFF | Disabled |
| ON | Enabled |

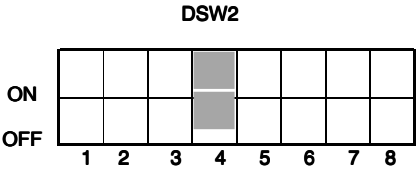



*** Factory Default**

### Hex Dump Selection (DSW2-4)

Enables Hex Dump mode.

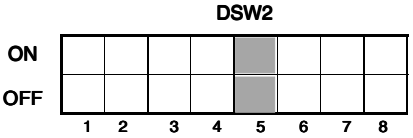
| DSW2-4 | SETTING |
|---|---|
| *OFF | Disabled |
| ON | Enabled |




### Receive Buffer Selection (DSW2-5)

Selects the operating mode of the receive buffer.

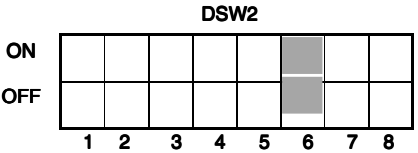
| DSW2-5 | SETTING |
|---|---|
| OFF | Single Job |
| *ON | Multi Job |




### Download Mode (DSW2-6)

For Firmware Download.

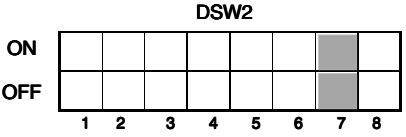
| DSW2-6 | SETTING |
|---|---|
| *OFF | Disabled |
| ON | Enabled |




### Protocol Control Code Selection (DSW2-7)

Selects the command codes used for protocol control.

| DSW2-7 | SETTING |
|---|---|
| *OFF | Standard |
| ON | Non-Std. |




*** Factory Default**

## Selecting Protocol Control Codes

Protocol control codes are the special control characters that prepare the printer to receive instructions. For example, the <ESC> character tells the printer that a command code will follow and the <ENQ> character asks for the printer status.

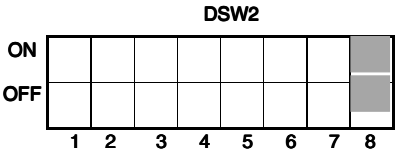
There are two pre-defined sets of Protocol Control codes to choose from. Each set is made up of six special characters. The Standard Protocol Control codes are non-printable characters, and the Non-Standard Protocol Control codes are printable characters. The Non-Standard set may be useful on host computers using protocol converters or in an application where non-printable ASCII characters cannot be sent from the host. This manual uses the Standard Protocol Control codes for all of the examples. Alternately, the user may define and download a set of custom Protocol Control Codes.

| CONTROL CHARACTER | STANDARD DSW2-7 OFF | NON-STANDARD DSW2-7 ON | DESCRIPTION |
|---|---|---|---|
| STX | 02 Hex | 7B Hex = { | Start of Data |
| ETX | 03 Hex | 7D Hex = } | End of Data |
| ESC | 1B Hex | 5E Hex = ^ | Command code to follow |
| Null | 00 Hex | 7E Hex = ~ | Cutter command |
| ENQ | 05 Hex | 40 Hex = @ | Get printer status, Bi-Com mode |
| Can | 18 Hex | 21 Hex = ! | Cancel print job, Bi Com mode |
| Off-Line | 40 Hex | 5D Hex = ] | Take printer Off-Line |

## Compatibility Mode Selection (DSW2-8)

Software command compatibility with earlier SATO model printers.

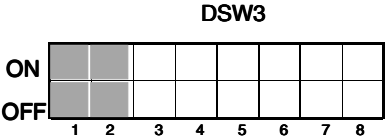
| DSW2-8 | SETTING |
|---|---|
| *OFF | Status 4 |
| ON | Compatibility |




## Mode Selection (DSW3-1 and DSW3-2)

Selects the operating mode of the printer.

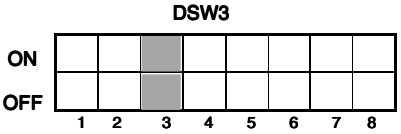
| DSW3-1 | DSW3-2 | SETTING |
|---|---|---|
| *OFF | *OFF | Batch/Continuous |
| OFF | ON | Tear Off |
| ON | OFF | Cutter |
| ON | ON | Dispenser |




## Label Sensor Selection (DSW3-3)

Enables or disables the Label Sensor. If the Sensor is enabled, it will detect the edge of the label and position it automatically. If it is disabled, the positioning must be under software control using Line Feed commands.

| DSW3-3 | SETTING |
|---|---|
| *OFF | Sensor Used |
| ON | Sensor Not Used |

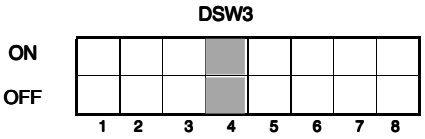



*** Factory Default**

### Back Feed Selection (DSW3-4)

When Back-Feed is enabled, the printer will position the label for dispensing/cutting and retract it to the correct print position before printing the next label.

| DSW3-4 | SETTING |
|---|---|
| *OFF | Enabled |
| ON | Disabled |




***Note:*** ***Back Feed function only works, if Tear Off, Cutter or Dispenser is selected. See DSW3-1, 3-2.***

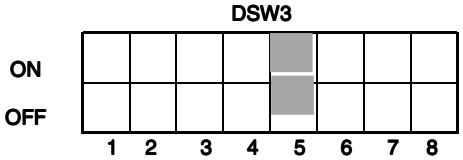
### External Signal Interface

The EXT connector on the CL printer rear panel is intended for use with the external printer accessories such as label rewinders or applicators. The 14-pin Centronics type connector provides a choice of four different output signals along with various error conditions.

### Print Start Signal Selection (DSW3-5)

| DSW3-5 | SETTING |
|---|---|
| *OFF | Disabled |
| ON | Enabled |

**(Output on Pin 5)**

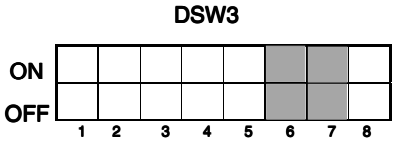



### External Signal Type Selection (DSW3-6, DSW3-7)

Both the polarity and signal type (level or pulse) of the external print synchronizing signal can be selected.

| DSW3-6 | DSW3-7 | SETTING |
|---|---|---|
| *Off | *Off | Type 4 |
| Off | On | Type 3 |
| On | Off | Type 2 |
| On | On | Type 1 |

**(Output on Pin 6)**



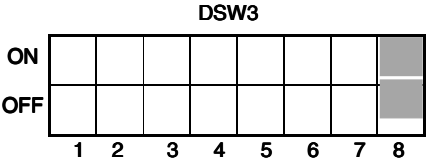

*** Factory Default**

### Repeat Print via External Signal (DSW3-8)

Allows the applicator to reprint the current label in the print buffer.

| DSW3-8 | SETTING |
|---|---|
| *OFF | Disabled |
| ON | Enabled |

(Output on Pin 7)




*Note: The DIP Switch functions listed incorporate the latest firmware revisions at the time of printing.*

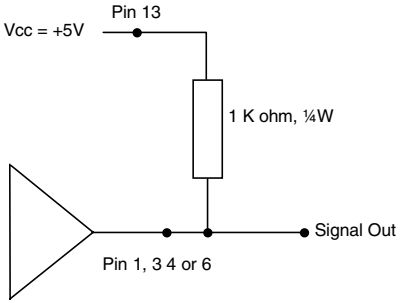
* Factory Default.

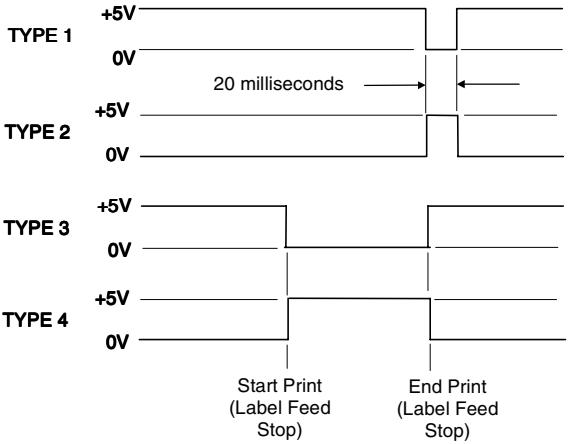
### 3.1.2 External Connector PIN Assignments

| PIN | DIRECTION | SIGNAL DESCRIPTION |
|---|---|---|
| 1 | To Host | Label Out - This pin goes low (0V) when a label out error exists. |
| 2 | Reference | Signal Ground |
| 3 | To Host | Ribbon Out - This pin goes low when the ribbon is out. |
| 4 | To Host | Error - This pin goes low when the printer detects an error condition such as head open or receiving buffer full. |
| 5 | To Printer | Print Start - The printer will print one label when this pin is pulled to ground. This signal must be enabled by placing switch DSW3-5 on the Control Panel in the OFF position. |
| 6 | To Host | End Print - It is used to drive an applicator or other external device requiring synchronization with the print cycle. You may choose between four types of output signals using control panel DSW3-6 and DSW3-7 selections. |
| 7 | To Printer | Print Repeat - The printer repeatedly prints the current label in the print buffer immediately after receiving this signal.<br>DSW3-8 must be ON. |
| 8 | To Printer | Vcc - +5V |
| 9 | To Host | On-Line |
| 10 | To Host | Ribbon Near End |
| 11 | To Printer | TBD |
| 12 | To Host | +24V - Used to power accessory items. |
| 13 | To Host | Vcc - +5V |
| 14 | Reference | Frame Ground |

*NOTE: The signals on pins 1, 3, 4 and 6 each have an open collector output. These pins normally measure +.07V maximum when a true condition exists. If a false condition occurs, the voltage will drop to 0V. To achieve a signal level of +5V, you must add a 1K ohm, ¼ W pull-up resistor between the open collector output pin and Vcc (pin 13) as illustrated. This will provide a signal level of +5V for a true condition and 0V when a false condition exists. The maximum voltage that can be applied to these pins is +50V and the maximum current they can sink is 500 milliamps.*

## 3.1.3 External Output Signal Types



## 3.2 Default Settings

### Switch Selections

All switches except DSW 2-5 are placed in the ***OFF*** position (default) for shipping. This will result in the following operating configuration:

- Communications: 8 data bits, no parity, 1 Stop bit, 9600 Baud
- Protocol: Ready/Busy
- Sensor: Gap Sensor
- Receive Buffer: Multi Job
- Mode: Batch/continuous
- Pitch: Sensor Used
- Back feed: Enabled
- External Signals: Disabled

### Software Default Settings

The CL408e/412e stores the software settings upon receipt and uses them until they are again changed by receipt of a command containing a new setting. These settings are stored in non-volatile RAM and are not affected by powering the printer off. The printer may be reset to use the default software settings by depressing the ***LINE*** and ***FEED*** keys simultaneously while powering the printer on. This will result in the following default configuration:

- Print Darkness: "3"
- Print Speed: 4 inches per second
- Print Reference: Vertical = 0001, Horizontal = 0001
- Zero: Slash
- Auto On Line: Enabled
- Ignore CR/LF: Disabled
- Character Pitch: Proportional
- Cover Open Sensor: Enabled
- Auto Online Feed: Disabled
- Feed On Error: Disabled
- Repeat Print: Enabled
- Forward/Backfeed: Standard
- Select Language: English
- Priority Setting: LCD

## 3.3 Printer Adjustments

The LCD Panel on the CL408e/412e printer is used in conjunction with the ***LINE*** and ***FEED*** switches by the operator to manually enter printer configuration settings. Many of the settings can also be controlled via software commands and in the case of conflict between software and control panel settings, the printer will always use the last valid setting. If you load a label job that includes software settings and then enter a new setting via the operation panel, the manually set values will be used by the printer. If you set the values manually and then download a job with software settings, the software settings will be used.

### 3.3.1 Normal Mode

When the printer is powered on, the readout should display the following message.

```
ONLINE
          QTY:000000
```

The LCD Panel will display the ***ONLINE*** status on the top line of the display and the bottom line will contain the label quantity (QTY) status. The ***ONLINE*** message will be changed to ***OFFLINE*** whenever the printer is switched ***OFFLINE*** by depressing the ***LINE*** key. As soon as a print job is received, the ***QTY*** message will indicate the number of labels to be printed. As soon as the label job begins to print, the display will indicate the number of labels remaining in the print job to be printed.

### 3.3.2 User Mode

1. The printer is first taken ***OFFLINE*** by pressing the ***LINE*** key once. The display will change to:

```
OFFLINE
          QTY:000000
```

2. When the display changes to ***OFFLINE***, press the ***FEED*** and ***LINE*** keys simultaneously for more than one second. The printer now displays the first USER mode adjustment (Print Darkness).

### 3.3.3 Print Darkness Setting

There are five ***PRINT DARKNESS*** (or heat range) settings on the CL408e/412e. The higher numbers represent darker settings. The current setting is indicated by a blinking curser on one of the range settings.

To change the setting perform the following steps:

1. Use the ***LINE*** key to step the blinking cursor to the desired setting.
2. Once the correct setting is selected, press the ***FEED*** key to accept the setting and advance to the next adjustment.

```
PRINT DARKNESS
1 2 3 4 5
```

***Note:*** ***This setting can be overridden by software.***

### 3.3.4 Print Speed Adjustment

There are five ***PRINT SPEED*** settings on the CL408e/412e. The setting is listed on the bottom line of the display. The current setting is indicated by a blinking curser on one of the speed settings.

To change the setting perform the following steps:

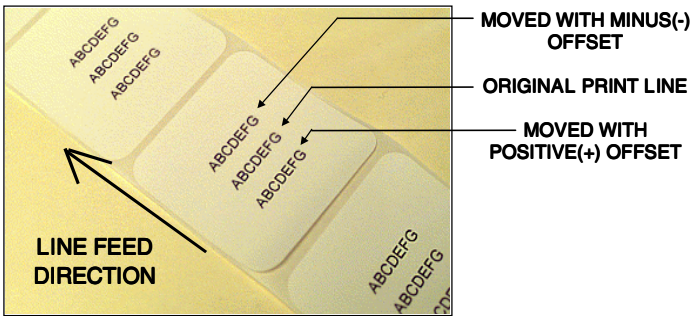
1. Use the ***LINE*** key to step the blinking cursor to the desired setting.
2. Once the correct setting is selected, press the ***FEED*** key to accept the setting and advance to the next adjustment.

```
PRINT SPEED
2 3 4 5 6
```

***Note:*** ***This setting can be overridden by software.***

### 3.3.5 Pitch Offset and Direction

The label pitch is the distance from the leading edge (the edge that comes out of the printer first) of a label and the leading edge of the next label. The leading edge position of the label can be adjusted relative to the print head +/- 49 mm in increments of 1 mm using the following procedure. Once the position is set, it can be adjusted +/- 3.75 mm using the ***PITCH*** potentiometer on the adjustment panel.




To change the setting perform the following steps:

1. Use the ***LINE*** key to step the counter to the desired position. The display will increment one step for each time the ***LINE*** key is pressed. If the ***LINE*** key is pressed continuosly the reading will advance to a setting of 49 mm after which it will automatically wrap and start with ***"00"*** again. The pitch direction set in the previous step will be displayed in front of the ***Offset*** setting.

| PITCH OFFSET |
| --- |
| +00mm |

2. Once the setting is correct, press the ***FEED*** key to accept the setting and advance to the ***CANCEL PRINT*** job display.
3. You may wish to check your settings by printing a test label after you have completed the adjustments to ensure that they are correct.

### 3.3.6 Cancel print Job

If the printer has a print job(s) loaded in memory, selecting ***YES*** will cause the job(s) to be cleared. The default selection is ***NO***. Make

sure that you want to cancel the print job before selecting **YES** as the job cannot be recovered and will have to be retransmitted to the printer.

To cancel the print perform the following steps:

1. Use the ***LINE*** key to step the blinking cursor to either ***YES*** or ***NO***.

| CANCEL PRINT JOB |
| --- |
| NO YES |

2. Once the correct setting is selected, press the ***FEED*** key to accept the setting and terminate the user mode of operation and return you to the normal mode ***ONLINE*** display.

   If you wish to change any of the settings, you must first set the printer to ***OFFLINE*** and enter the user mode again by simultaneously pressing ***FEED*** and ***LINE*** keys for more than one second.

### 3.3.7 Advanced Settings

See Appendix A for advanced settings.

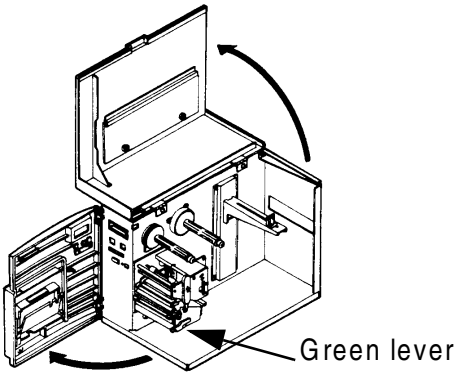
Please not that you will need special instructions for some of these settings!

# 4. Media Loading

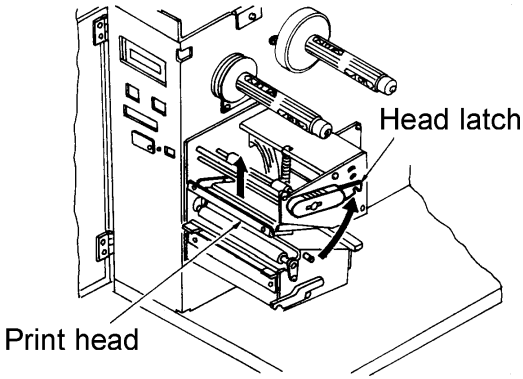
## 4.1 Loading Labels

### 4.1.1 Label rolls

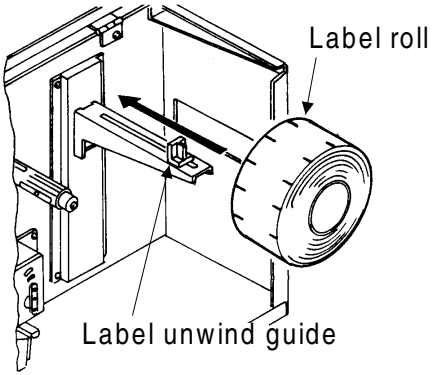
1. First, open the top cover by swinging it up and then open the front door by pressing the green lever downwards.



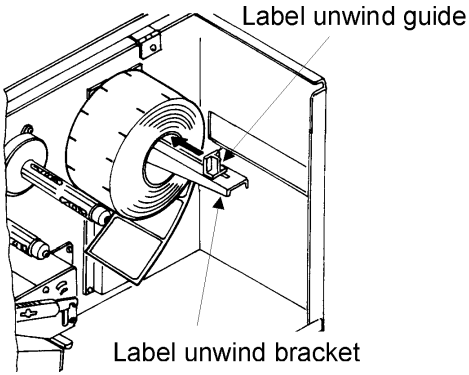

2. Open the print head assembly by turning the head latch toward the rear of the printer. The print head assembly is spring-loaded and will automatically open as soon as the head latch is disengaged.



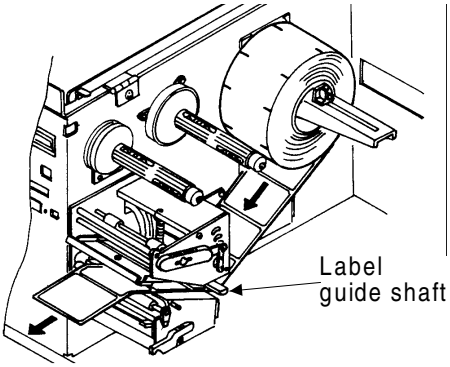
3. Push the label unwind guide to the outside of the printer to give the maximum label width.



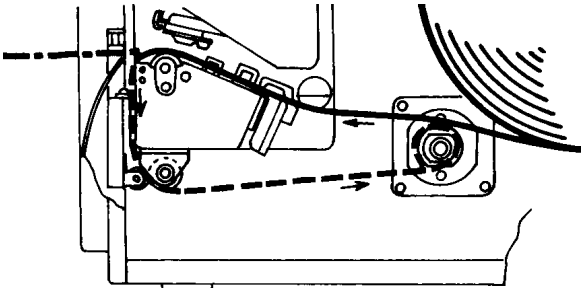

4. Load the media roll onto the label unwind bracket so that the printing side of the labels faces upwards as it unwinds from the roll. Push the roll all the way to the inside of the printer and push the label unwind guide snugly against the outside of the label roll.



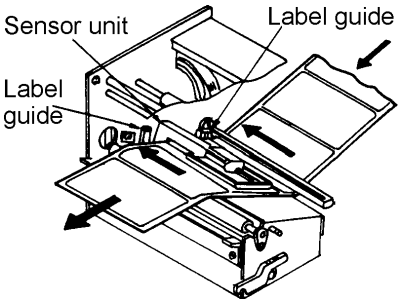
5. Feed the labels under the label guide shaft, through the print head assembly and out of the front of the printer.




***Note:*** ***When the label dispenser option has been installed, remove 600 to 800 mm of labels from the backing and feed the backing back through the label dispense path.***

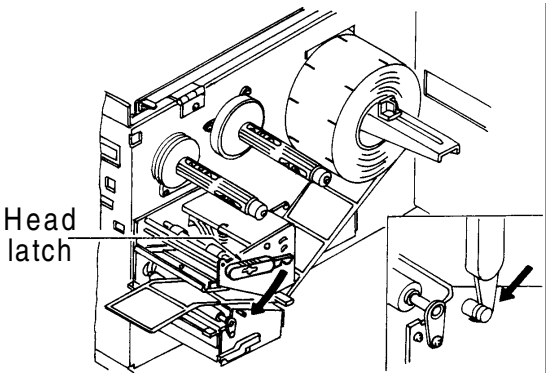


6. Inspect the label route and check that the path matches that illustrated in the label loading diagram. Set the adjustable label guides to keep the labels against the backplate of the printer.

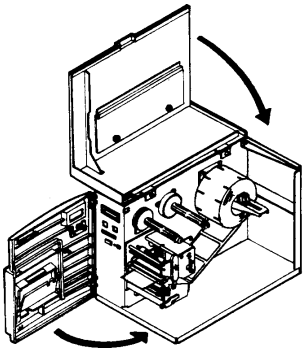



***Note: The following step is not for Thermal direct.***

7. If the ribbon is already loaded, close the print head assembly by pushing downward the head latch until it latches closed.
If the ribbon is not loaded, see the description for loading ribbons on page 47.

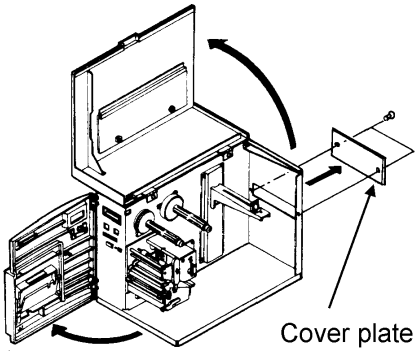


8. Close the front door and the top cover.

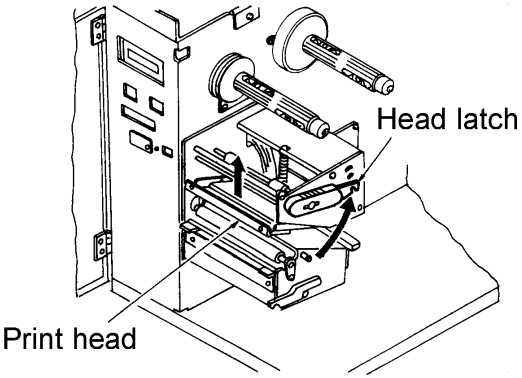


### 4.1.2 Fanfold Labels

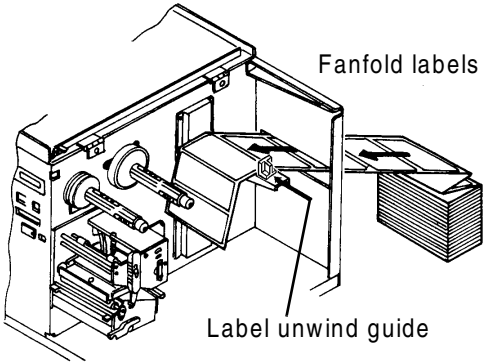
1. Open the top cover by swinging it up and then the front door by pressing the green lever downwards. Remove the cover plate from the rear panel.



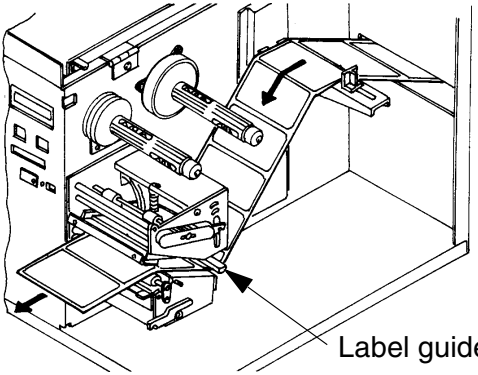
2. Open the print head assembly by turning the head latch toward the rear of the printer. The print head assembly is spring-loaded and will automatically open as soon as the head latch is disengaged.



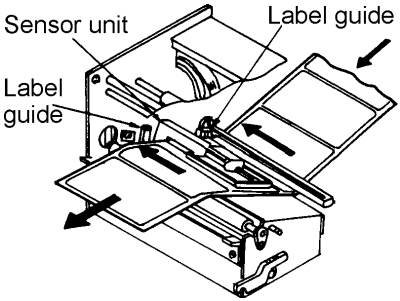

3. Lay the fanfold labels behind the printer and feed them through the slot and over the label unwind bracket. The printing side of the labels has to show upwards. Push the label unwind guide snugly against the outside of the fanfold label.



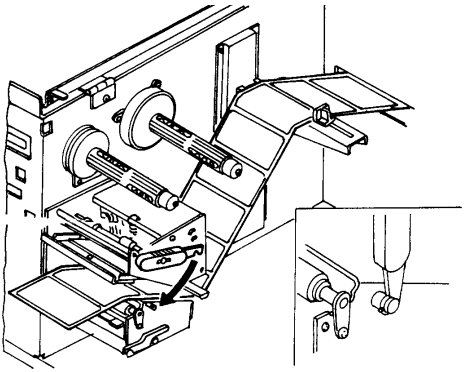
4. Feed the labels under the label guide shaft, through the print head assembly and out of the front of the printer.



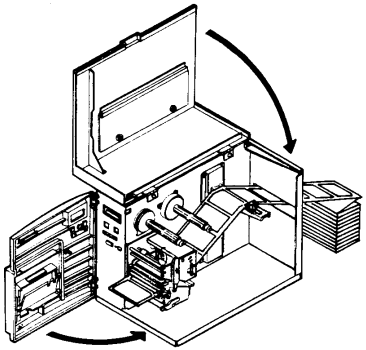

5. Inspect the label route and check that the path matches that illustrated in the label loading diagram. Set the adjustable label guides to keep the labels against the backplate of the printer.



6. If the ribbon is already loaded, close the print head assembly by pushing downward the head latch until it latches closed.
   If the ribbon is not loaded, see the following description in chapter 4.2 Loading the ribbon.

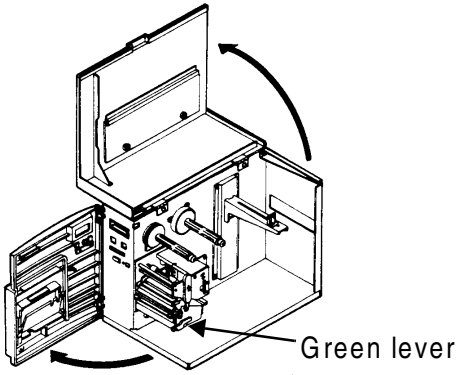


7. Close the front door and the top cover.

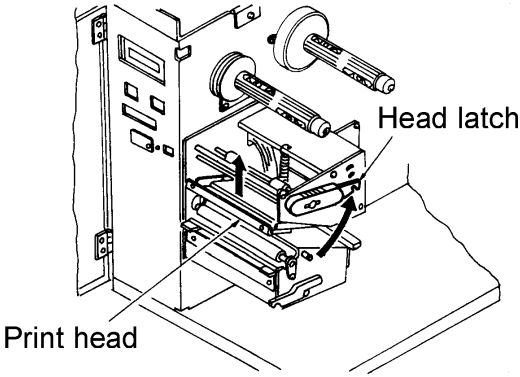


## 4.2 Loading the Ribbon

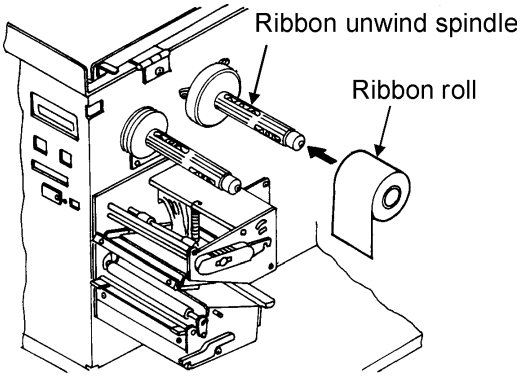
1. Open the top cover by swinging it up and the front door by pressing the green lever downwards.



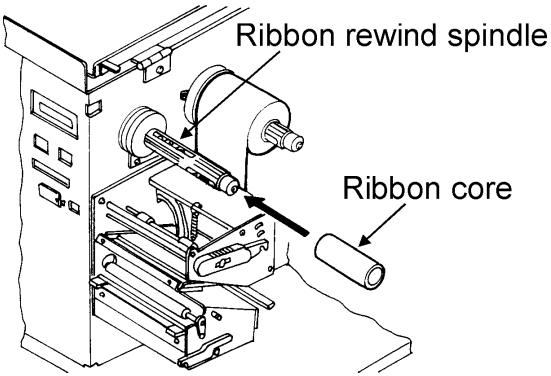

2. Open the print head assembly by turning the head latch toward the rear of the printer. The print head assembly is spring-loaded and will automatically open as soon as the head latch is disengaged.



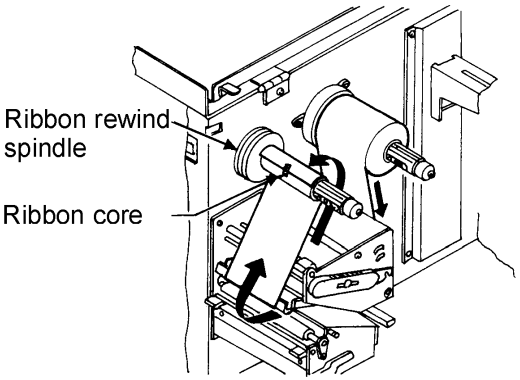
3. Load the ribbon onto the ribbon unwind spindle, pushing it all the way to the inside of the spindle. The side of the ribbon carrying the carbon ink must be inwards while unwinding the carbon ribbon roll counter-clockwise.



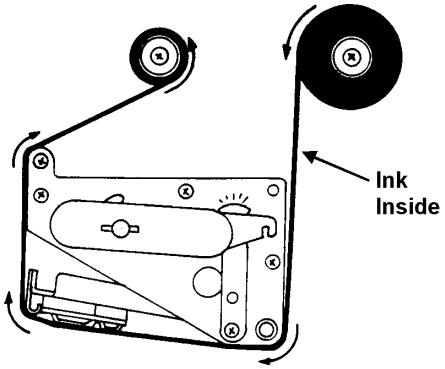

4. Place the core on the ribbon rewind spindle, pushing it all the way to the inside of the spindle. Note that the empty core of each subsequent roll becomes the next rewind core.



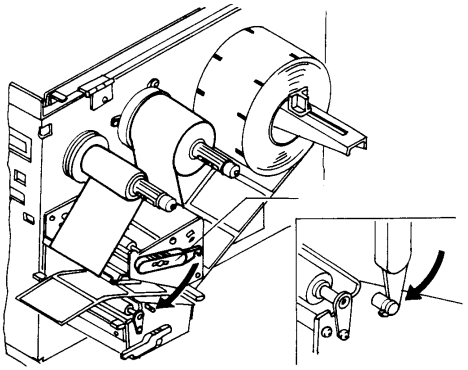
5. Feed the leader portion of the ribbon through the print head assembly and up to the ribbon rewind spindle and tape it to the ribbon core. Manually turn the rewind spindle to wrap the ribbon onto the core making one to two turns to secure it.




6. Make sure the ribbon path matches the one shown in the diagram.

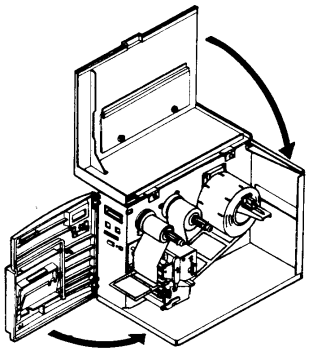


7. If the labels or tags are already loaded, close the print head assembly by pushing downward on the green tab until it latches closed.



Head latch

8. Close the front door and the top cover.



***Note:*** ***Run a test print to ensure that the labels and ribbons are loaded correctly.***

# 5. Troubleshooting

The design of the SATO CL-408e/412e printer is based upon proven technology and reliable components. When a problem occurs, the solution can be easily traced using the troubleshooting tables in this section. This table list symptoms, probable causes, and suggested corrective actions.

Both print quality and general operational problems are listed in the troubleshooting table.

## 5.1 Print Quality Problems

| Symptom | Probable Cause | Suggested Corrective Action |
|---|---|---|
| Image Voids | Poor quality labels | Use thermal transfer compatible stock |
| | Poor quality ribbons | Use genuine SATO ribbons |
| | Ribbon not matched to label stock | Check with media suppliers<br>Select better suited carbon ribbon<br>Contact your local dealer |
| | Damaged electronics | Replace circuit board |
| | Damaged Platen | Replace Platen |
| Ribbon Wrinkle | Poor Head Alignment | Adjust head balance<br>Adjust ribbon roller<br>Adjust head alignment |
| | Poor Ribbon Tension | Adjust ribbon tension |
| | Worn Platen | Replace platen |
| | Foreign material on head or platen | Clean head and platen |
| | Foreign materials on labels | Use high quality label stock |
| | Damaged print head | Replace print head |

| | | |
|---|---|---|
| Light Images | Poor quality labels | Use thermal transfer compatible stock |
| | Poor quality ribbons | Use genuine SATO ribbons |
| | Low print head energy/darkness | Adjust darkness control |
| | Low print head pressure | Use correct head pressure position |
| | Ribbon not matched to label stock | Select better suited carbon ribbon<br>Contact your local dealer |
| | Low ribbon drive torque<br>No ribbon movement | Adjust ribbon drive clutch |
| | Foreign material on head | Clean head and platen |
| | Poor head alignment | Align Print Head |
| | Excessive print speed | Reduce print speed setting |
| Smearing | Poor quality labels | Select better suited carbon Ribbon |
| | Poor quality ribbons | Use genuine SATO ribbons |
| | Foreign material on head/platen | Clean head and platen |
| | Foreign material on labels | Use high quality label stock |
| | Excessive print head energy | Adjust darkness control |
| | Excessive print speed | Adjust print speed |
| | Excessive head pressure | Use correct head pressure position |
| No Ribbon Movement | Incorrect ribbon core size | Use genuine SATO ribbons |
| | Loose drive clutch | Adjust clutch tension |
| | Loose platen drive belt | Adjust/replace belt |
| | No + 24 volt output | Test power supply and replace if required |
| | Loose service screws on rewind pulley | Tighten service screws |
| | Damaged electronics | Replace circuit board |

| | | |
|---|---|---|
| No Label Movement | Loose/broken platen drive belt | Adjust/replace belt |
| | Incorrect label pitch sensor selected | Select correct label sensor type (DSW2-2) |
| | No +24 volt output | Test power supply and replace if required |
| | Loose set screw on platen pulley/stepper motor | Tighten set screws |
| No Printed Image | Print head not connected | Verify print head connector fully seated at head and main PCB |
| | Ribbon upside down | Use genuine SATO ribbons |
| | No + 24 volt output | Test power supply and replace if required |
| | Damaged print head | Replace print head |
| | Damaged electronics | Replace circuit board |
| Back light but no words on display or no display. | Most common failure of printer is DOA situation<br>The most likely cause is the ribbon cable is disconnected or not connected firmly | Verify that the cable and connector are properly seated |
| POWER | AC power cable not connected | Verify that the cable is connected to the printer and the AC outlet |
| | Main Power Fuse defective | Replace fuse |
| | Defective power supply | Test power supply and replace if defective |
| HEAD OPEN | Head not locked | Close and latch head release |

| | | |
|---|---|---|
| LABEL END | Label supply roll empty | Replenish label supply |
| | Label stock not routed through sensor | Reload labels correctly |
| | Label sensor not positioned correctly | Adjust sensor position |
| | Label sensor blocked | Clean label sensor |
| | Incorrect label sense threshold setting | Adjust label sense threshold |
| | Platen drive malfunction | See Service Manual |
| RIBBON END | Ribbon supply roll empty | Replenish ribbon supply |
| | Ribbon sensor out of alignment | Realign ribbon sensor |
| | Ribbon sensor blocked | Clean ribbon sensor |
| | No cardboard core on ribbon rewind | Use cardboard core on ribbon rewind |
| SENSOR ERROR* | Auto Treshold not in range | Check label path, sensor position and DIP switch setting |
| No Label Drive | Timing Belt bad/loose | Replace/tighten timing belts |

***Note:*** ***This error condition is stored in the printer memory. To reset this error it is necessary to open the print head while printer power is ON.***

# 6. Cleaning and Maintenance

### Proper handling

The print head contains a precise printing surface that must be carefully protected from mechanical damage. Extreme care must be exercised during handling and installation to prevent scratching, chipping, denting or otherwise damaging the exposed surface.

### Cleaning

Only solvent, i.e. alcohol and other cleaning methods recommended by SATO should be used to periodically remove paper residue from the print head. Apply carefully with a cotton swab. Frequency of cleaning depends upon paper type and mechanical factors and should be completed at each ribbon change. Only clean when the printer is switched off and cooled to room temperature to avoid thermal shock damage.

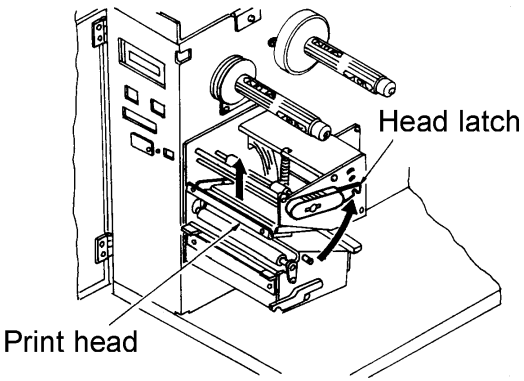
Do not operate the machine immediatly after cleaning to ensure the head is totally dry of any cleaning fluids.

Do not use abrasive materials in cleaning. However, SEG supplies a special lapping film, SEG-No. 1938, to clean the print head surface.

## 6.1 Cleaning the Print Head

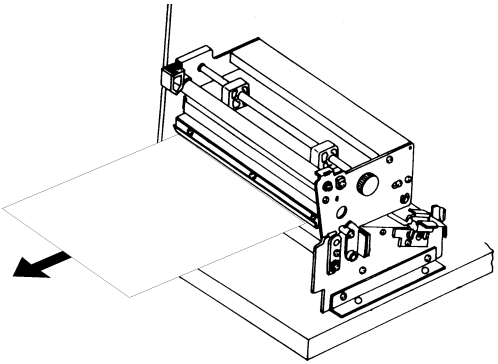
### 6.1.1 Cleaning the Print Head using Print Head Cleaner

1. Switch off the power to the printer.
2. Open the top cover and the front door.
3. Open the print head assembly by turning the head latch toward the rear of the printer. The print head assembly is spring-loaded and will automatically open as soon as the head latch is disengaged.
4. Apply any SATO approved thermal print head cleaner to a cotton swab.
5. The print head faces downward along the front edge of the assembly. Pass the end of the dampened swab along the entire width of the print head. (You may need to move the ribbon out of the way to do this.)
6. Check for any black colouring or adhesive on the swab after cleaning.
7. Repeat as necessary until the swab stays clean, after being passed over the head.
8. The head should be cleaned at least every time the ribbon is changed and more often in dusty environments.



### 6.1.2 Cleaning the Print Head using the Lapping Film

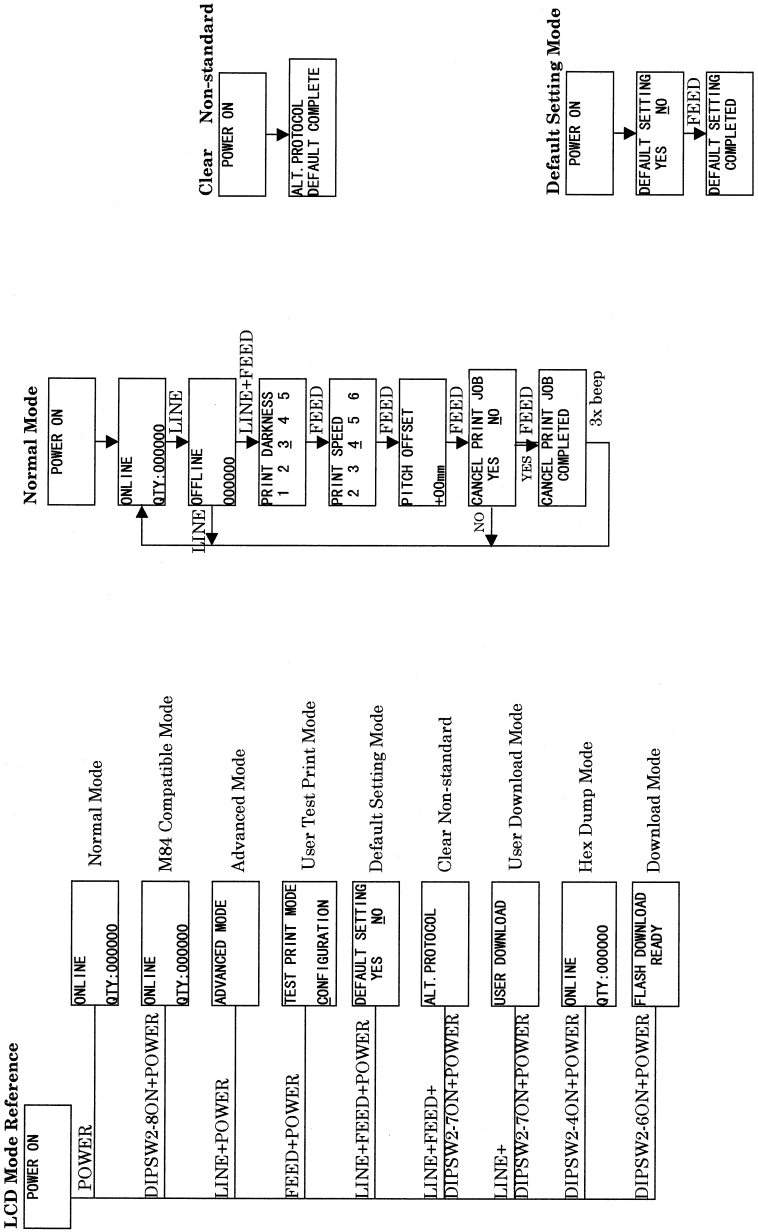
1. Cut the lapping film with a pair of scissors or a sharp knife to 120mm width.
2. Switch off the power to the printer.
3. Place the lapping film between print head and platen with the abrasive side face-up. Close the print head with the head latch.
4. Pull the cleaning film by hand slowly toward the front of the printer.
5. Repeat steps 3 and 4 two or three times.
6. Finally, clean the print head with a print head cleaner as described previously.



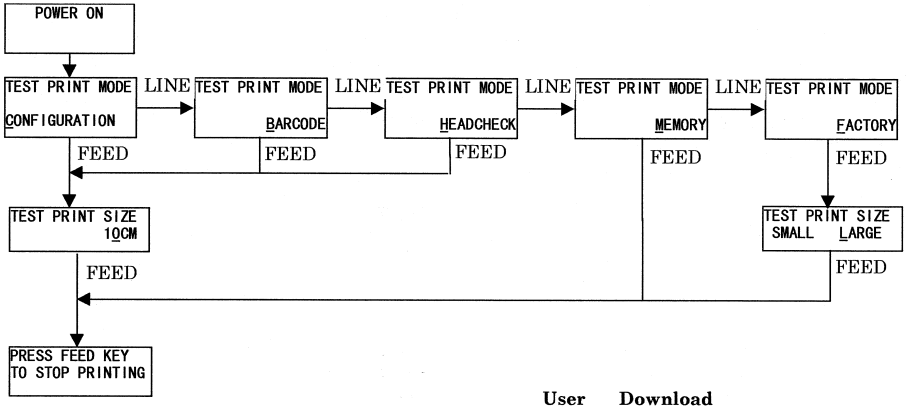
## 6.2 Cleaning the Platen and Rollers

1. Switch off the power to the printer.
2. Open the top cover and the front door.
3. Open the print head assembly by pushing the head latch toward the rear of the printer. The print head assembly is spring-loaded and will automatically open as soon as the head latch is disengaged.
4. Apply any SATO approved cleaner to a clean wipe.
5. The platen is the rubber roller directly below the print head. It should be cleaned of any ribbon or label residue.
6. The label unwind guides used in guiding the labels through the printer must be cleaned of any label or ribbon residue or other foreign material.
7. Repeat as necessary. The platen and rollers should be cleaned whenever foreign matter such as dust or adhesive is present.

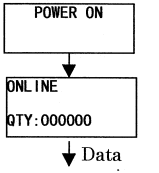
# Appendix A Advanced Settings



**User Test Print Mode**

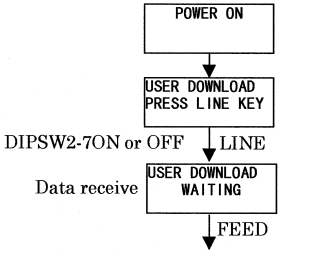



**Hex Dump Mode**



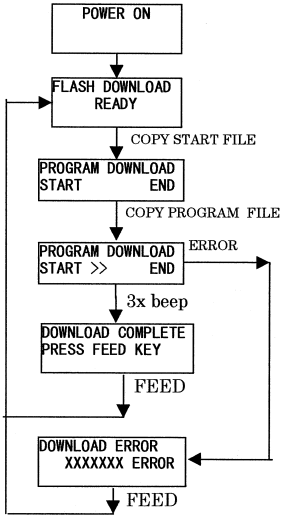

Hex Dump Print

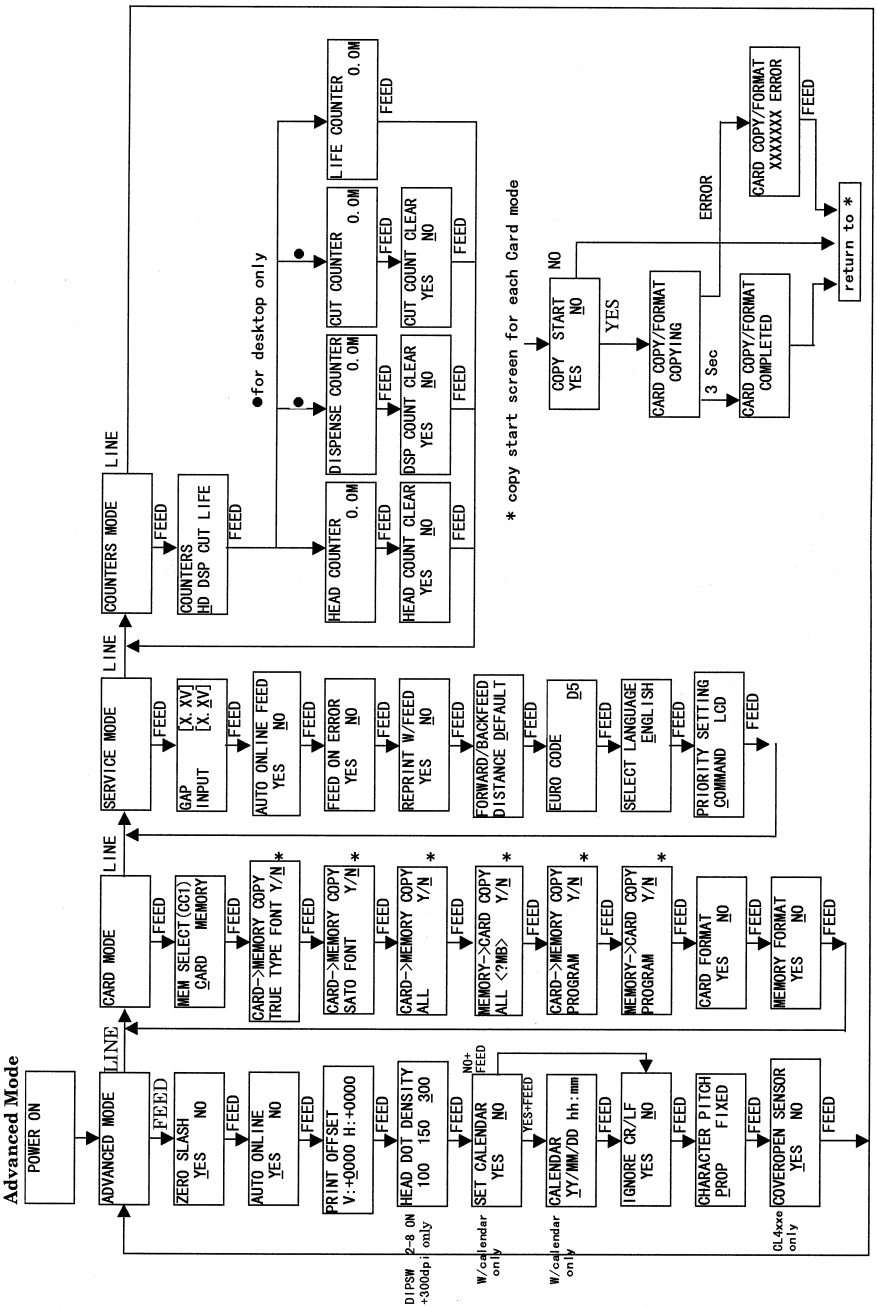
**User Download**




Data store

**Download Mode**




Advanced Mode
POWER ON
ADVANCED MODE
LINE
FEED
ZERO SLASH YES NO
AUTO ONLINE YES NO
PRINT OFFSET V:+0000 H:+0000
HEAD DOT DENSITY 100 150 300
SET CALENDAR YES NO
YES+FEED
NO+FEED
CALENDAR YY/MM/DD hh:mm
IGNORE CR/LF YES NO
CHARACTER PITCH PROP FIXED
COVEROPEN SENSOR YES NO
DIPSW 2-8 ON +300dpi only
W/calendar only
W/calendar only
CL4xxe only
CARD MODE
MEM SELECT(CC1) CARD MEMORY
CARD->MEMORY COPY TRUE TYPE FONT Y/N*
CARD->MEMORY COPY SATO FONT Y/N*
CARD->MEMORY COPY ALL Y/N*
MEMORY->CARD COPY ALL <?MB> Y/N*
CARD->MEMORY COPY PROGRAM Y/N*
MEMORY->CARD COPY PROGRAM Y/N*
CARD FORMAT YES NO
MEMORY FORMAT YES NO
SERVICE MODE
GAP [X.XV] INPUT [X.XV]
AUTO ONLINE FEED YES NO
FEED ON ERROR YES NO
REPRINT W/FEED YES NO
FORWARD/BACKFEED DISTANCE DEFAULT
EURO CODE D5
SELECT LANGUAGE ENGLISH
PRIORITY SETTING COMMAND LCD
COUNTERS MODE
COUNTERS HD DSP CUT LIFE
●for desktop only
HEAD COUNTER 0.0M
HEAD COUNT CLEAR YES NO
DISPENSE COUNTER 0.0M
DSP COUNT CLEAR YES NO
CUT COUNTER 0.0M
CUT COUNT CLEAR YES NO
LIFE COUNTER 0.0M
* copy start screen for each Card mode
COPY START YES NO
CARD COPY/FORMAT COPYING
CARD COPY/FORMAT COMPLETED
3 Sec
ERROR
CARD COPY/FORMAT XXXXXXX ERROR
return to *

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# MANUFACTURERS
# DECLARATION OF CONFORMITY

| | | |
|---|---|---|
| **Product identification** | Product: | Thermal or Thermal Transfer Printer |
| | Type: | **CL 408e-2A** |
| | Options: | all |

**Means of conformity**
The product is in conformity with the **EMC Directive 89/336/EEC, 92/31/EEC and 93/68/EEC** based on test results using harmonised standards.

| | |
|---|---|
| **EMC** standards used: | EN55022: 1998 (class B) +A1, A2<br>EN55024: 1998 +A1, A2<br>EN61000-4-2 /95+A1,A2<br>EN61000-4-4 /95+A1,A2<br>EN61000-4-5 /95+A1<br>EN61000-4-6 /96+A1<br>EN61000-4-11 /94+A1 |
| Test carried out by: | EMC Test Haus Dr. Schreiber GmbH, Siegen, Germany |
| Test Report No.: | 6 / 203 |
| Date: | 19. 11. 2004 |
| | EN61000-4-3: 1996<br>EN61000-4-8: 1993 |
| Test carried out by: | Cosmos Corporation |
| Test Report No.: | S22211-1a /b /c /d |
| Date: | 27. 03. 2002 |

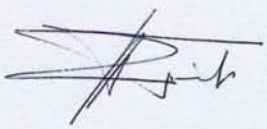
The product is in conformity with the **Low Voltage Directive 73/23/EEC** based on test results using the harmonized standards.

| | |
|---|---|
| Standards used: | EN60950 : 1992+A4+A11 |
| Test carried out by: | TÜV Product Service |
| Test Certificate No.: | B 00 09 24958 008 |
| Test Report No.: | 18J0090-01 |
| Date: | 22.02.2000 |

**Manufacturer**: Bar Code SATO Electronics (M) SDN. BHD.
Lot 20, Jalan 223
46100 Petaling Jaya
Selangor Darul Ehsan, Malaysia

**EC Representative**: SATO Europe NV Leuvensesteenweg 369
1932 Sint-Stevens-Woluwe
Brussels, Belgium

| | |
|---|---|
| Signature: | Patrick Frimat |
| Function: | Managing Director |
| Datum: | 09. 12. 2004 |



File: CL408e-2A

# MANUFACTURERS
# DECLARATION OF CONFORMITY

| | | |
|---|---|---|
| **Product identification** | Product: | Thermal or Thermal Transfer Printer |
| | Type: | **CL 412e-2A** |
| | Options: | all |

**Means of conformity**
The product is in conformity with the **EMC Directive 89/336/EEC, 92/31/EEC and 93/68/EEC** based on test results using harmonised standards.

| | |
|---|---|
| **EMC** standards used: | EN55022: 1998 (class B) +A1, A2<br>EN55024: 1998 +A1, A2<br>EN61000-4-2 /95+A1,A2<br>EN61000-4-4 /95+A1,A2<br>EN61000-4-5 /95+A1<br>EN61000-4-6 /96+A1<br>EN61000-4-11 /94+A1 |
| Test carried out by: | EMC Test Haus Dr. Schreiber GmbH, Siegen, Germany |
| Test Report No.: | 6 / 203 |
| Date: | 19. 11. 2004 |
| | EN61000-4-3: 1996<br>EN61000-4-8: 1993 |
| Test carried out by: | Cosmos Corporation |
| Test Report No.: | S22211-1a /b /c /d |
| Date: | 27. 03. 2002 |

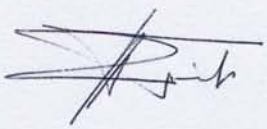
The product is in conformity with the **Low Voltage Directive 73/23/EEC** based on test results using the harmonized standards.

| | |
|---|---|
| Standards used: | EN60950 : 1992+A4+A11 |
| Test carried out by: | TÜV Product Service |
| Test Certificate No.: | B 00 09 24958 008 |
| Test Report No.: | 18J0090-01 |
| Date: | 22.02.2000 |

**Manufacturer**: Bar Code SATO Electronics (M) SDN. BHD.
Lot 20, Jalan 223
46100 Petaling Jaya
Selangor Darul Ehsan, Malaysia

**EC Representative**: SATO Europe NV Leuvensesteenweg 369
1932 Sint-Stevens-Woluwe
Brussels, Belgium

| | |
|---|---|
| Signature: | Patrick Frimat |
| Function: | Managing Director |
| Datum: | 09. 12. 2004 |



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